

**Breakout Group 6**  
**Watershed Scale Reductions and Off-sets**  
**TMDL Implementation Workshop**  
**June 14, 2005**

**Goals:**

- 1) Develop a strategy or list of options that will allow loads to be reduced to a level that will be consistent with the TMDL. Investigate potential options for load reduction for both point and nonpoint sources as they may apply to the situation.
- 2) Using the information provided regarding future land use plans; develop a strategy or list of options that could be used to maintain the TMDL load.
- 3) Consider how options for addressing Goal 2) (maintaining the cap) might help to address Goal 1) (reducing the loads).

**Setting**

The setting is a watershed of 25,500 acres with a recently developed TMDL for nutrients. The controlling nutrient is nitrogen and the TMDL is written for total nitrogen. Within the watershed, there are two municipal point sources, and two permitted industrial point sources; however, the larger industrial source has announced that it will be ceasing operations within the year. The current land use is provided in the table below.

Point sources are currently within their allocations; however, the nonpoint source load will require reductions to meet the TMDL and off-sets will be needed to support the addition growth reflected by zoning and pending subdivisions.

Meanwhile, planned land use changes such as subdivision development projects, and additional land zoned for development result in the following. Projected growth in the village serviced by the small WWTP produces a need for waste treatment capacity to almost double. The current WWTP has effectively reached capacity, in part due to an aged sewer collection system that experiences significant inflow and infiltration (I&I) during wet weather conditions.

A TMDL has been established with the following allocations.

<b>TMDL (TN)</b>	<b>=</b>	<b>Point Source Allocations</b>	<b>+</b>	<b>Nonpoint Source Allocations</b>
<b>212,000 lbs/yr</b>	<b>=</b>	<b>101,000</b>	<b>+</b>	<b>111,000</b>

**Point Source Load Allocation:**

- Small Municipal WWTP  
(Design flow capacity of 91,000 gallons per day, 18 mg/l, Allocation of 5,000 lbs/yr)
- Large Municipal WWTP  
(Design flow capacity of 3.1 million gallons per day, 8 mg/l, Allocation of 75,000 lbs/yr).
- Small Industrial WWTP  
(Flow of 18,000 gallons per day, 18 mg/l, Allocation of 1000 TN lbs/yr)
- Large Industrial WWTP  
(Flow of 0.365 million gallons per day, 18 mg/l, Allocation of 20,000 TN lbs/yr, ceasing operations within the year)

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**Current Point Source Load:**

- Small Municipal WWTP  
(Current flow of 75,000 gallons per day, 18 mg/l, Load of 4,109 lbs/yr)
- Large Municipal WWTP  
(Current flow of 2.5 million gallons per day, 8 mg/l, Load of 60,880 lbs/yr).
- Small Industrial WWTP  
(Flow of 18,000 gallons per day, 18 mg/l, Load of 1000 TN lbs/yr)
- Large Industrial WWTP  
(Flow of 0.365 million gallons per day, 18 mg/l, Load of 20,000 TN lbs/yr, ceasing operations within the year)

**Current Nonpoint Source Load:**

Land Use	Land Use Acres	TN Loading Rate lbs/ac/yr	TN Load lbs/yr
Mixed Agriculture	12,000	15.3	183,600
Atmospheric Deposition to water	1,500	9.6	14,400
Forest	8,400	1.2	10,080
Open Urban	300	4.5	1,350
Urban on Septic	2,500	14.7	36,750
Urban on sewer	800	7.5	6,000
<b>Total Nonpoint Source Load</b>	25,500		<b>*252,180</b>

\*Nonpoint source (NPS) load reduction needed to achieve TMDL = 56% or 141,180 lbs

\*\*Application of Tributary Strategy land uses and assessment of future land use changes result in a reduction of the NPS loads to **166,725lbs/yr**

**Projected Land Use Changes:**

Zoning and pending subdivisions would convert 1000 acres of forest, and 250 acres of crop land into the urban land use category.

- 90% will be on public sewer if sufficient capacity exists at either of the WWTPs. The land has potential for about 1,500 equivalent dwelling units (EDUs).
  - About 20% of the land allocated for development is located near the small WWTP. It has a 450 (EDU) potential; however, the small plant flow capacity would need to be doubled (or more if current I&I problems are not resolved). (EDU = 250gal/day and 450\*250 = 112,500gal/day and 6136lbs of TN/yr)
- 10% is planned to use onsite sewage disposal systems.